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AUTHOR Lesher, Ronald E.
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ABSTRACT

Various defintions of creativity are reviewed and classified according to the relative emphasis that each places on the product, the process, and the personal experience of creativity. The assessments of creative products are usually unreliable because of the problem of defining what is creative. Attempts at assessing the creative process fall roughly into two categories: (1) attitudinal phenomena during the creative process and (2) creativity as ability. Attempts at assessing the creative person have relied on elaborate personality tests. Although not developed specifically for studying the creative person, they do present some consistent characteristics among creative persons. Past background and the current environment have been studied by other researchers. This approach has implications for prediction of creative performance, but little use in evaluating school programs trying to promote creativity. Therefore, the selection of measures of creativity must depend on the way in which information is to be used. No one approach is completely adequate, and perhaps several approaches should be used simultaneously. (Author/SM)

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Assessment of Creativity

by

Ronald E. Lesher

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Like a long-legged fly upon the stream

His mind moves upon silence.

William Butler Yeats

What a delight this is I cannot tell.

Wolfgang Amadeus Mozart

ABSTRACT

Various definitions of creativity are reviewed and classified according to the relative emphasis that each places upon the product, the process, and the personal experience of creativity.

The techniques used to assess creativity are classified according to whether they attempt to look at the product, the process, the person, or the environment in which creativity takes place.

The assessments of creative products are usually unreliable because of the problem of defining what is creative. The norm of unusualness changes with time and place, thus causing the disagreement among judges.

Attempts at assessing the creative process fall roughly into two categories: (1) attitudinal phenomena during the creative process and (2) the elements of the creative process itself. First attempts at looking at the attitudinal phenomena used unstructured interviews. More recently different ways of structured interviews or structured questionnaires have been used.

The elements of the creative process approach have presupposed that creativity is an ability. The more refined attempts to measure this ability have tried to isolate various parts of the creative process. Some of these have attempted to look at very specialized aspects of an artistic endeavor, while others use abstract problem solving situations as universal indicators of creativity. Others look not at a single task, but at a complete battery of verbal and nonverbal tasks. In contrast to these which have emphasized the production of many responses, there are several attempts which call for a single correct response.

Attempts at assessing the creative person have relied upon elaborate personality tests. Although not developed specifically for studying the creative person, they do present some consistent characteristics among creative persons.

Both the past background and the current environment have been studied by other researchers. Like the attempts at assessing the creative person, this approach has implications for prediction of creative performance, but little use in evaluating school programs trying to promote creativity.

A final section emphasizes the possibility of looking at aesthetic response through similar approaches to those used in the study of creativity.

The selection of measures of creativity must depend upon the way in which information is to be used. Probably no one approach is completely adequate and perhaps several approaches should be used simultaneously to get a look from several points of view.

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This paper has been written to summarize the current state of the art of the assessment of creativity. The full statement of the New Jersey outcome goal on creativity is:

> TO ACQUIRE THE ABILITY AND THE DESIRE TO EXPRESS HIMSELF/ HERSELF CREATIVELY IN ONE OR MORE OF THE ARTS, AND TO APPRECIATE THE AESTHETIC EXPRESSIONS OF OTHER PEOPLE.

In the initial search of the literature on creativity, one finds a great interest in not just creative expression in the arts alone, but a much broader approach to creative expression or creative production in all fields. This paper thus addresses the field of the measurement on assessment of creativity in this more general context.

Definitions of Creativity

There are probably as many definitions of creativity as there have been researchers on creativity. The substance and tone of the definitions range widely from the inspired and immanent subjective experience of Maslow (1971) to the novel and useful manifest product of McKinnon (1962).

It has been suggested by Getzels and Dillon (1973) that the different conceptions of creativity can be classified according to the relative emphasis that each places upon the product, the process, and the personal experience of creativity. A few of these conceptions will be presented to show the variety and similarities in thought.

MacKinnon (1967) selected his sample of creative writers, architects, research workers in the physical sciences and engineering, and mathematicians through nominations by experts in their own fields. The emphasis was upon a novel and useful manifest product. From the product perspective, criteria of social worth, uniqueness, and historical aesthetics are of great importance in defining creativity.

But by far the greatest number of conceptions of creativity are from the process viewpoint. However, this is not to imply that they are highly similar.

Torrance and Torrance (1973, p. 6) have defined creative thinking as:

> A natural human process in which a person becomes aware of a problem, difficulty, or gap in information for which he has no learned response: searches for possible solutions from his own past experiences and those of others: formulates hypotheses about possible solutions; evaluates these possible solutions and tests them; modifies them and retests them; and communicates the results to others.

The work of J P. Guilford (1967), particularly on divergent production abilities, has long been associated with creativity. Guilford describes <u>fluency</u> as concerned with the ready flow of ideas; <u>flexibility</u> as concerned with the readiness to change direction or to modify information; <u>originality</u>; and

elaboration as concerned with filling out details. It has been argued that these four factors are important in divergent production and thus in creative production.

The work of Mednick and Mednick (1964) reflects the same concern with divergent product abilities but with the additional requirement that a single unique solution be found. This stands in marked contrast to both Guilford and Torrance who have not focused much attention on this additional requirement of convergence.

Maslow (1971) emphasizes the inspired and immanent subjective experience. He observes that the creator (p. 61) "in the inspirational phase of the creative furor, loses his past and his future and lives only in the moment." For Maslow this moment transcends time, the ego, space, society, and history. Those familiar with Maslow's work will recognize the similarity of this experience and the "peak experience." In fact, Maslow equates the concept of creativeness and the concept of the healthy, self-actualizing, human person.

There have even been attempts to incorporate several aspects within the same definition. Newell, Shaw, and Simon (1962) have suggested that creative thinking may be defined by: product has novelty and value for the thinker, or the culture: the thinking is unconventional, highly motivated and persistent or of great intensity: the task involves a clear formulation of an initially vague and undefined problem.

Clearly, creativity is not a neat simple concept. Perhaps the most interesting attempt to look at creativity from multiple points of view is that of Jackson and Messick (1967). Creativity is viewed from five perspectives: (1) predisposing cognitive styles of the creator, (2) personal qualities of the creator, (3) responsive properties of the creative product, (4) judgemental standards for the creative product, and (5) aesthetic responses. An outline of the five viewpoints is included in Table 1.

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TABLE 1

CONCEPTIONS OF CREATIVITY

Predisposing Cognitive Styles	Personal Qualities	Responsive Properties	Judgemental Standards	Aesthetic Response
Tolerance of incogruity, of inconsistency	Original	Unusualness	Norms	Surprise
Analytic and intuitive	Sensitive	Appropriateness	Context	Satisfaction
Open minded	Flexible	Transformation	Constraints	Stimulation
Reflective and spontaneous	Poetic	Condensation	Summary power	Savoring

The ideas in Table 1 are nested within each column. By "nested' it is meant that the first criterion is the most important in the sense of being necessary but not sufficient for understanding creativity from that perspective. To illustrate for a product to be creative it must first be unusual (column 3), although this is not enough. In addition, the product must be appropriate to the context in which it is presented, thus ruling out the absurd or bizarre. One could continue with the properties of transformation and finally condensation in a similar manner.

The other property of the Jackson and Messick conceptualization is the parallel quality of each column. Each row is a dimension or unitary idea across the five perspectives. Therefore it makes sense to say that an original person (column 2) has a predisposing cognitive style of tolerance of incongruity (column 1) and that this person produces an unusual product (column 3) when judged by the prevailing norms (column 4) which produces a response of surprise (column 5) in the viewer. Again the same thing could be done for each of the four rows.

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The usefulness of Jackson and Messick's conceptualization of creativity is this unity of the five viewpoints. In addition, unity is provided to the New Jersey creativity goal in that it looks at both creative expression and aesthetic response. However, to date, little research has been published that directly uses the Jackson and Messick framework.

Approaches to the Assessment of Creativity

There have been four broad approaches to the assessment of creativity. The first three parallel to the classifications of definitions presented above. Thus assessment has focused on the product, the process, and the person (earlier referred to as the personal creative experience and here broadened to include the whole person). Finally there have been attempts to assess the environment in which creativity occurs.

In terms of the Jackson and Messick conceptualization, the assessment of creative product would include aspects of both the responsive properties and the judgemental standards. The assessment of the creative process and the creative person overlap a great deal. On the one hand the qualities of the person, such as flexibility, might be studied; but on the other hand a task in which being flexible is called for might be more reflective of the creative process. In either case the categories of predisposing cognitive styles and personal qualities are of prime importance.

The next several sections will consider in turn how creativity has been assessed from each of these four approaches. An attempt will be made to point out some of the strengths and weaknesses of each approach.

Assessment of Creative Product

The assessment of creative products is usually done by an expert, a critic, or a panel of judges. Despite the great variation in assessments, this

system is widely accepted in both the arts and in everyday life. Concerts are reviewed by music critics, plays are reviewed by theatre critics, consumer goods are rated by panels of experts from testing organizations, and children are evaluated by adults.

One of the major difficulties in assessing creative products and the reason for tremendous variation between critics or judges is the problem of the criteria of creativity. The Jackson and Messick (1967) conceptualization gives a way that the different criteria can be compared. A set of norms must be used by which to judge the unusualness of the product. For example, Torrance (Torrance Tests of Creativity, 1966) gives the statistical frequency of responses of a previous sample of students to use as a norm by which to determine the unusualness of responses to questions in his battery of tests.

The other types of criteria are much more difficult to specify. The matter of context and the ruling out of bizarre or absurd products is not so simple. Time has a way of later accepting as creative what was at the time of creation considered absurd. The histories of art and music are both filled with examples. As one proceeds to look at the last two types of criteria, constraints and summary power, some of the same difficulties are encountered. There are probably adequate examples of works that have transcended the constraints of the time of creation and examples of works that possess summary power (Einstein's theory of relativity probably illustrates both a transcendence of the constraints of physics at the turn of the century and a great summary power which is still being felt today), but these examples usually have been around for years. The immediate assessment of creative products usually does not have this benefit of the passage of time.

As an approach to the assessment of creativity, the judging of creative product presents another difficulty. An inference that the creator is "creative"

or possesses "creativity" is usually made. If a single product is being assessed, then the sample of one may not be representative of the larger output of the individual. In the history of mathematics and science many people are remembered for a single creation and the rest of their work is an elaboration of their original idea. For the artist like Picasso or the composer like Stravinsky different ideas have governed their works at different times in their lives.

Assessment of Creative Process

There are two major schools of thought in the assessment of the creative process. The first focuses on the attitudinal phenomena during the creative process. The second looks closely and more directly at pieces of the process or the simulation of the creative process.

The attitudinal school of thought is a relatively recent development and has used only two approaches to assess the attitudinal set of the creator during the creative process. The first approach has been to interview the creative person and from a relatively unstructured situation try to assess his entire attitudinal set. This approach is not frequently used probably because of the unreliability associated with the interview and its rating. However, the approach has been important in that it led to the standardization of an interview or questionnaire to assess attitudinal set during the creative process.

This second approach has many variations. Two different techniques will be described. Ghiselin, Rompel, and Taylor (1964) developed two series of adjectives, one for describing "states of attention" and one for "states of feeling." Although they did not find the use of the adjective check list very useful in discriminating between the more creative and less creative Air Force scientists, they did find evidence that certain of the designated states of attention and combinations and sequences of the states were favorable or unfavorable at different stages of any effort to produce new insight. They also confirmed

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their idea that a higher degree of definiteness and stability opposes the appearance of new insights.

A slightly different technique was used by Rookey (1971) in the Pennsylvania Assessment of Creative Tendency (PACT). Each item in PACT describes a situation and the student is asked how strongly he is attracted or repelled by that situation.

Both of these techniques may suffer from inadequate sampling of material utilized. That is, the most ovious adjectives may be present in the adjective check lists, but they may not be adequate to describe the entire attitudinal set during the creative process. Likewise a similar criticism is possible for PACT. To some extent PACT is also vulnerable to students giving desired responses rather than true responses. In fact, this criticism can be leveled at all self-report measures. Despite these limitations, PACT has established some validity and reliability in the many studies that have been conducted throughout the state of Pennsylvania (Rookey, 1973).

The second major school of creative process assessment is concerned with creativity as an ability. Thus it is the ability of the creator to do various things that is assessed. For the purposes of this paper six approaches have been identified that attempt to assess the creator's ability to do some aspect of the creative process. Historically, most attempts to measure creativity have been variations of these six approaches.

The first approach is to use an observer to assess the ability of a creator. Typically experts in a given field are asked to nominate the most creative in their chosen field. Drevdahl (1964) did this with psychologists and MacKinnon (1964) has also done this with architects. In each case, a single criterion of "creative" was used. Because the criterion is not further specified there is a great variability in response, probably for the same reason that there are so many definitions of creativity. To illustrate the degree of variability

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that one might expect when using a general criterion of "creative", the MacKinnon (1964) study will be used. MacKinnon asked five architecture professors to nominate the 40 most creative architects. A total of 86 nominations was received from the five professors and 40 of the 86 had been nominated by only a single professor.

A variation of this approach has been developed by Greenberger (1971). A rating scale was used after a direct observation. This at least specified the dimensions of interest, but even so the whole approach has been criticized because of the dependence upon a uniform view among raters or observers to get a fair degree of agreement.

The next three major approaches are more highly structured variations of the first approach. The first approach was to rate the creator in the natural setting. The next three deal with contrived tasks calling for a display of creativity. Briefly, the second major approach presents a task, the product of which is rated and interpreted as a universal indicator of creativity. The third major approach also, presents a task, usually in some field of artistic endeavor; the product is rated and interpreted as an indicator of creative ability in that field. The fourth major approach presents a collection of symbolic tasks which are rated on several facets of creative ability. Each of these approaches will be discussed and examples of assessment instruments presented.

Several examples of the use of a single task as a universal indicator of creativity should suffice to show the variety of measures that have been proposed. In the Utility Test (Guilford, 1967) the respondent is asked to list as many uses for a common brick and a common wooden pencil in 10 minutes. The total number of uses suggested by the respondent is his score.

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In another test Expressional Fluency (Guilford, 1967) the respondent is given four initial letters and is asked to construct four word sentences. No one word may be used more than once. As an example, the respondent might be given:

W_____ f _____ r _____ d _____

One possible answer would be "Who found Rover dead?" The total number of sentences that one completes is the score.

A third example of the many Guilford tests is Match Problems II (Guilford, 1967) in which the respondent is given a set of adjacent squares or triangles of the same size, each line being composed of a match. The problem is to remove a specified number of matches leaving a specified number of squares or triangles and having no left over matches. The test also asks for as many as four different solutions per situation.

Although there is usually consistency of performance when these tests are readministered, there is a serious question of what is really being measured. On the one hand, one must make the assumption that if a person is creative he will also score high on any of these tests, that is, he is universally creative. This assumption is open to question. There is also a contaminating factor of background or exposure. All other things being equal, wouldn't a crossword puzzle fan do better on the Expressional Fluency than a person who had never done a crossword puzzle; and wouldn't a person previously exposed to puzzles similar to those in Match Problems II do better than a person who never did puzzles of this sort? It is quite possible that these tests are measuring more about a person's background than about his ability to create. They seem to be too specific and limited in scope.

The third approach to creative process assessment (considering creativity an ability) presents a task from some field of artistic endeavor and interprets it merely as an indicator of creativity in that field. This approach arises out of the one of the problems of interpretation of the general tasks just presented. An example of this approach is the Balagais Rating Scale for Creative Movement (Mentioned in Rookey, 1973). One might be able to build a case that a cwrtain level of performance on this type of task is necessary to be reasonably confident that a person is "creative" in this narrow field, but again the problem of background may interfere. Thus a high score may also indicate a good background and a great deal of exposure to the field in question, and not necessarily creativity in that field.

The fourth approach to creative process assessment (considering creativity an ability) likewise grows out of a criticism of the single general task described as the second major approach. To overcome the problem that a person may not do well on that particular task, a battery of tests of both verbal and nonverbal subtests is presented and the person's performance is summed over the whole battery. The Torrance Tests of Creativity (Torrance, 1966) is one of the most widely used instruments of this approach. The verbal part includes an Ask and Guess test, a Product Improvement task, an Unusual Uses task, an Unusual Questions task, and a Just Suppose activity. The figural part includes a Picture Completion activity, an Incomplete Figures activity, and a Parallel Lines activity. Although the basic activities differ, each is scored on four criteria: (1) fluency (2) flexibility, (3) originality, and (4) elaboration. These are the same criteria that Guilford (1967) has proposed. The number of relevant responses produced by the respondent is the measure of <u>fluency</u>. The number of different categories of questions, causes, consequences, products, or uses gives a measure of <u>flexibility</u>. The statistical infrequency of these responses (based on earlier research) is the measure of <u>originality</u>. Finally the number of

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embellishments on responses provides an elaboration score. A total score for each of the four criteria is obtained by summing across all verbal and figural subtests. In practice the composite and subtest scores are all reported for each of the four criteria.

Several criticisms have been leveled at the Torrance Tests of Creativity. Each test must be hand scored, usually requiring several scorers if results are desired in a relatively short period of time. All scorers should have a good amount of experience with scoring these tests to insure "fair" scoring, that is a high degree of reliability among raters.

The tests are administered in a test-like atmosphere and this may not be conducive to creative production. As was reported earlier by Air Force scientists (Ghiselin, Rompel, and Taylor, 1964) creativity cannot be bound tightly by time or any high degree of definiteness or stability.

The method of scoring by summing criteria scores across the subtests has been questioned (Harvey, Hoffmeister, Coates, and White, 1970). In many cases the fluency, flexibility, and originality scores on a single subtest were more closely related than was a single criterion (e.g., flexibility) across the seven subtests. Thus the performance on a single task seems to be a more unitary idea, than each of the composite criteria.

Wallach and Kogan (1965) have also developed a creativity battery. Like the Torrance Tests, the Wallach and Kogan Creativity Tests include both verbal content (Instances, Alternate Uses, and Similarities) and visual content (Pattern Meanings and Line Meanings). The tests are administered without time constraint and in a game-like atmosphere. Each subtest scored for (1) fluency, the number of responses given and (2) uniqueness, the number of responses produced by only one person in the sample. Quality of response is not a primary concern in the scoring, although bizarre responses are eliminated.

White the Wallach and Kogan Creativity Tests may do well in measuring the flow of ideas or fluency, the lack of a measure of quality of the responses in disturbing. Creativity in all the conceptions has to do with quality. Perhaps the Wallach and Kogan tests should not invoke the word "creativity" but merely state what they seem to measure best, the ability to produce many responses and the ability to produce unique responses.

The next two approaches to creative process assessment are seemingly quite different from the previous three. The previous three have emphasized the production of many responses, and thus have been often called measures of divergent thinking or divergent production. These next two approaches emphasize ultimately a single response, and therefore have been often called convergent production.

The fifth approach to creative process assessment presents tasks which have a single correct answer. This approach is based upon some special form of reasoning. Although there have been several tests developed along this line, perhaps the best known is Cattell's Hidden Shapes (Cattell, 1956). Eighteen simple geometric figures are presented, each followed by four more complex figures. The respondent is asked to determine which of the complex figures contains the simpler geometric figure. Catell has described the trait measured as critical exactness. Getzels, and Jackson (1962) described this as the ability to disregard superfluous detail in perceptual situations or to perceive essentiaks quickly.

While the Hidden Figures is easily scored and has been adequately standardized, repeated exposure yields higher scores. Since there is a significant practice effect it cannot be used repeatedly over a period of time. Like the other single task tests, it too may be assessing a narrowly defined ability.

it may limit creative ability too much.

The sixth approach to Creative process assessment, although in the end demanding convergence or a single correct response, differs from the last approach. When a stimulus is given, the creator needs to name events associated with the stimulus. The goal is tonname more and more remote associations which are still relevant. Then given several stimuli the one association common to all the stimuli is the required single correct answer. For example in the Remote Associates Test (Mednick and Mednick, 1962) consider the following stimuli:

bug finger killer

The required common association is "lady". Worthen and Clark (1971) have criticized the Remote Associates Test (RAT) for inclusion of the type of item just cited. The association is based on their structural proximity in common written or oral language, and thus the RAT may reflect the language background or language experience of an individual more than it does the ability to form remote associations. Worthen and Clark went on to define a functional association as any association based on a nonlanguage relationship that exists in reality, e.g., "bird" and "egg". A new test the Functionally Remote Associates Test (FRAT) (Worthen and Clark, 1971) was constructed, and in three studies the authors established that indeed the FRAT is less related to other measures of language ability than the RAT.

In both cases the tests are easy to score, but again there is a question that the task may be too narrowly defined to be a good measure of creativity.

Assessment of the Creative Person

Much of the work on the assessment of the creative person has been associated strongly with the psychoanalytic or self-actualizing schools of psychology. Because of this, the work is typically not oriented to developing assessment techniques per se. The assessment techniques are therefore developed as by products and are not necessarily even specifically for identifying the

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creative person.

As an example of this type of work, some of the study of creative persons by the use of a specific personality test (Sixteen Personality Factor Questionnaire) will be briefly summarized. The Sixteen Personality Factor Questionnaire (16 PF) like all self-reports is liable to distortion, either from dishonesty or from lack of self-insight in the respondent. However, it has been found useful and is fairly reliable in the research situation with cooperative subjects.

Of particular interest to therreaders of this paper are the consistent findings of researchers using the 16PF. Creative chemists and chemical engineers (Jones 1964, 1966), creative graduate students (Drevdahl, 1956) and writes of imaginative literature (Drevdahl and Cattell, 1958) all exhibited similar profiles or characteristics on the 16 PF. Whether or not these same characteristics would appear at earlier age levels has not been adequately studied. Likewise, the use of personality tests in group situations has not produced as reliable results as in the more controlled research studies.

Assessment of the Environment in which Creativity Occurs

Several studies have made an attempt to assess what in the environment of an individual relates to creative production. By environment here is meant both the past background which contributes to what the individual is today, as well the current environment. A classic study (Taylor and Ellison, 1964) led to the publication of the Alpha Biographical Inventory which is suitable for high school juniors and seniors. The 300 item survey covers areas of family life, developmental history of the individual, academic background, and adult life and interests.

The approach to the development of the instrument is to seek highlights which are common to some recognized creators (in this case the early work was done with NASA scientists). Two criticisms have been leveled at this approach. First people tend to remember selectively and thus the self-report procedure may be yielding false impressions. Secondly, and perhaps more important a sample of "non-creative" people or some other control sample is not utilized. Thus the highlights or indicators may in fact not be unique to the creative individuals.

Dispite these criticisms, a great amount of effort has gone into the Alpha Biographical Inventory and its predecessors which were used with scientists. And the effort has produced an instrument that is worth while for the prediction of creative output. Nonetheless, its proper place must be understood. The factors it measures (family life, developmental background, and interests) are not subject to easy change. It is not sensitive therefore to changes produced by education and is not useful for the evaluation or assessment of the impact of educational programs.

Assessment of Creativity - Summary and Conclusions

A number of recent studies have addressed the very real problem of how to measure creativity. It should be obvious to the reader that the selection process for an instrument measuring creativity does not suffer from too short a list from which to pick. Nonetheless educators have typically fallen back on only a few from the long list of alternatives: Torrance Tests of Creativity, the Wallach and Kogan measures, the RAT, and the Alphia Biographical Inventory

(ABI). The first three of these are measures of the creative process considering creativity as an ability). The fourth is a measure of the environment in which creativity takes place.

Davis and Belchar (1971) found that RAT scores were fairly similar to IQ scores. On the other hand the ABI creativity score and the Torrance scores seemed to be quite different than the RAT. This was identified by Ward to be the ability to produce a greater number of associations (fluency in Torrance!s terms.)

Crochenberg (1972) in an extensive review of the Torrance and Wallach and Kogan batteries concludes that the evidence suggests that they both are measuring something different than IQ. However, there is some difficulty is associating this something with a universal measure of creativity. Perhaps it would be better to simply label these instruments as measures of fluency or ability to produce associations.

Davis and Belcher (1971) further suggest that the ABI creativity score seems to be the best predictor of creative production or creative potential, yet these authors also recognize that in many educational situations, a different sort of measure is needed. If a measure of change is needed (as opposed to the stable background reflected in the ABI) then the Torrance or Wallach and Kogan measures probably tell us something about how students are changing when participating in a training program. Davis and Belcher also suggest a measure of interests or attitudes since training programs usually are trying to change attitudes and interests.

One other study (Feldman, et al., 1971) suggests a further possibility for development of greater conceptual clarity. The authors attempted to go beyond a simple attempt to use the criteria of unusualness and appropriateness from Jackson and Messick's scheme (1967). Torrance's criteria of originality can be considered to go only as far as unusualness and appropriateness in the

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Jackson and Messick scheme. From Torrance's point of view the person generating the most original responses is considered the most fluent and therefore the most creative. The authors (Feldman, et al) found that the best responses in terms of Jackson and Messicks transformation criterion were not in fact produced by the most fluent people. Further development of the use of the Jackson and Messick scheme (although not easily scored) may yield much new information about assessing creativity.

One thing should be obvious to the reader, that there are many approaches to the assessment of creativity. All of them are open to criticism. In spite of that, however, the instruments appear to be measuring a multifaceted phenomenon which has generally been called creativity. Any serious effort to assess creativity should probably use more than a single approach and recognize there are several importnat aspects to creativity. Depending upon the purpose for assessing creativity, certain approaches seem more promising than others. The ABI looks fairly good for prediction, but has no purpose in an attempt to assess impact of an educational program. The Torrance and the Wallach and Kogan batteries have both been useful in measuring fluency and originality. This is not to suggest that the other approaches have not been useful. Too many of them have not been widely enough used in order to know what they are really measuring and what their limitations are.

AESTHETIC RESPONSE

The field of the assessment of aesthetic response is a much less systematically studied one than the assessment of creativity. One could cite measures of aesthetic response to music, to art, to architecture and so on. But this only reveals how fragmented the work has been.

Rather than focus on the different disciplines this section will focus on some of the problems of measurement of aesthetic response and the possible utility of the Jackson and Messick scheme. Since their approach is a unifying one, the comments here will also probably hold for the measurement of creativity that has been described already. Hopefully, then this will in a sense summarize the major challenges to measurement.

One major problem in the measurement of aesthetic response is our word-boundedness. Words are usually required in at least one aspect of the measurement device, either as input (the question itself) of as output (the responses). One major exception to this is the Kyme Test of Aesthetic Judgments in Music (Kyme, 1969).

When words form the input, the questions often take the form of statements to which the student reacts or statements which require that some choice be made. As was mentioned with some of the approaches to the assessment of creativity, the form of the question often makes obvious what is being assessed, so the respondent makes a choice which he feels is appropriate. The respondent is not necessarily being dishonest; the idealized person may be answering instead of the real person. And so his actions may not match his words.

One may attempt to overcome this problem, by trying to assess aesthetic response by unobtrusive measures in the natural setting. The number and kinds of books that students buy, the music recordings they buy, the radio stations to which they listen, and the concerts to which they go are all indicators of aesthetic response. Nonetheless they are only practical as group indicators and rahter crude at that. Self-reports of such behavior can be attempted, but then we're back where we started, self-report and the problems associated with that.

Another problem is associated with the making of value judgments. One can start with the more obvious. One painting is obviously more colorful, one sculpture more craftmanship, one musical selection more full. These are not preferences, but judgments which can be substantiated through consensus of

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experts. However, these are usually the less important ones. When one gets to selecting between two objects which are more nearly the same, the problem is difficult. The content of culture at a particular time and place is involved in these preferences. And this context of culture changes in time and location.

RECOMMENDATIONS

Before the author could recommend that creativity be measured on a statewide basis, there are several issues which need to be explored and thoroughly understood. These issues deal with several of the factors contributing to the misunderstanding about creativity that has arisen in education. Each will be presented in the form of a recommendation.

1. It is recommended that the purpose ofor measurement of creativity and aesthetic response on a statewide basis be clarified.

The reasons for this recommendation by now should be fairly obvious. If a measure is expected to be sensitive to fairly short-term changes, then c rtain types of measures are called for. If on the other hand it is important to suggest types of expeirences that are missing for many students in a local community, then another type of measure is necessary. Perhaps there are several purposes for which the test data will be collected. It is entirely possible that several types of measures should therefore be used. This really leads to the next recommendation.

2. It is recommended that any effort to measure creativity and aethetic response recognize the multifactednnature of the phenomenon.

The many attempts to measure creativity that have been presented in this paper show the great variety of phenomena that can be looked at. Just

to summarize, recognition must be made of the importance of divergent thinking, the quality of the response and the ability to be able to come to a single solution that brings a work to a satisfying conclusion.

3. It is recommended that each aspect that is measured be labelled with term that reflect what is being measured.

It is tempting to continue to hide behind the label of "creativity." In order to prove useful to most of the educators, students, and general public those most important aspects, such as divergent thinking, should be spoken of directly instead of clouding the atmosphere with simply calling it "creativity."

Finally a few words about where or how the breakthroughs may occur that will lift us above the state of the art today. Jackson and Messick's scheme has a unifying element that links creativity and aesthetic response by looking at the parallel aspects of the person, the process, and the product. Further, research in using this scheme may stimulate the work that still needs to be done to enable us to know what are the most critical aspects of fostering creativity among our youth.

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